New Product

New 3300, 5 mm Proximity Probe aids in machine retrofits and tight installations

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Various types of large rotating machinery use eddy current, proximity probes to measure shaft vibration, position, phase, speed, differential expansion and other parameters. These measurements provide machinery condition information important for today's machinery protection and management systems.

Bently Nevada is pleased to announce a new addition to the 3300 Proximity Transducer System. It is the *3300, 5 mm Proximity Probe.* The main benefits of using this new proximity probe are:

- Small probe sizes now available for the 3300 Transducer System having *¼-28 or M8 threads* used in machine retrofits and tight installations.
- Large 2 mm (80 mil) linear range for most machine vibration and thrust measurement applications.
- Robust construction seals 690 kPa (100 psi) pressure between probe tip and case for pressurized machine cases.
- Approved by CENELEC and Canadian Standards Association (CSA) for use in hazardous areas.
- Complies with Europe's CE requirements assuring excellent RFI resistance.
- 7.87 mV/µm (200 mV/mil) signal is compatible with all Bently Nevada monitors and diagnostic equipment.
- Completely interchangeable with 3300, 8 mm Proximitor® Sensors and extension cables.

An important design consideration was to make the 3300, 5 mm compatible with our best proximity transducer, the 3300, 8 mm Proximity Transducer System. We designed the 3300, 5 mm Probe to be *completely interchangeable* with the 3300, 8 mm System. The 5 mm Probe can use the same extension cable and Proximitor® Sensor as the 3300, 8 mm System. By making the 3300, 5 mm Probe interchangeable we have:

- Reduced the number of spare parts needed to support the 3300 Transducer System.
- Simplified the system by supplying fewer parts to connect compared to having two different proximity systems with incompatible parts.
- Kept the same outstanding accuracy when using either 5 or 8 mm probes.

Simply put, the complexity usually involved when installing 5mm or 8 mm proximity probes on a machine train has been virtually eliminated.

Excellent for retrofits and small machines

Many machines, currently in use, are fitted with various types of ¼-28 and M8 proximity probes. When replacing these probes, the 3300, 5 mm Proximity Probe allows you to stay with this smaller probe size without re-drilling the machine to a larger thread size. During a machine overhaul or monitoring system upgrade, the 3300, 5 mm Proximity Probe is an ideal solution for retrofitting machines that are pre-drilled for ¼-28 or M8 vibration and thrust probes. It is our most accurate and reliable probe of this size.

Small machines with fluid film bearings will sometimes use small probes due to space limitations. Some turbines, pumps and compressors do not have enough physical space available for anything larger than a 5 mm probe. This can occur when there is a lack of probe mounting area or when obstructions near the probe interfere with its installation. The 3300, 5 mm Proximity Probe, with its compact size, will usually solve this problem.

For axial thrust position measurements, proximity probes are sometimes mounted between the thrust pads of the thrust bearing where they observe the thrust collar. Again, the 3300, 5 mm Proximity Probe's small size allows it to mount in this location with relative ease, while still providing ample linear range for most thrust position measurements.

Small, durable probe

The 3300, 5 mm Proximity Probe is a culmination of our extensive experience

designing small probes, plus some features which were added as a result of our latest design efforts.

- Newly-designed thermoplastic tip for increased moisture resistance.
- Our patented Tip Loc™ molding method keeps the probe tip from twisting and vibrating loose.
- Our patented Cable Loc™ design provides 34 kg (75 pounds) of pull strength between the probe cable and case.
- Stainless steel probe case and connectors provide superior strength and corrosion resistance.
- Stainless steel armor available for probe and extension cable.
- High pressure feedthrough available for a cable seal option on pressurized machines.

Proximity transducers are the heart of the machinery monitoring system. They have to be durable because they measure rotor motion inside the machine where extreme temperatures, pressures, pH, and vibration can reside. Proximity transducers must also be accurate and reliable because the entire machine protection and management system depends on their signals.

XY vibration measurements

XY radial vibration measurements are the standard for monitoring journal bearing machines. Anything less precludes adequate protection and diagnostic capabilities. A minimum shaft diameter of 51 mm (2 inches) is necessary when using two 3300, 5 mm Probes in an XY configuration.

Quality design

The 3300, 5 mm Proximity Probe is designed to work in most rotating and reciprocating machinery applications. The service life of the probe is virtually unlimited since it does not make contact with the rotating shaft and has no moving parts to wear out or degrade. Field-proven components, high accuracy and a quality design make up the 3300, 5 mm Proximity Probe. These features will provide reliable service and added value for the years ahead. Contact your nearest Bently Nevada sales representative for more information. ■

Important names in Rotor Dynamics

Aurel Stodola pioneered early turbine and compressor design

Aurel Stodola, 1859-1942, was born in Liptovsky Mikulas, Slovak Republic, which was part of the Austro-Hungarian Empire at the time. He was a contemporary of Albert Einstein and was one of the world's major rotordynamicists, according to Don Bently, "because he took the time and effort to put together a compendium, a bible, of steam and gas turbines." Don Bently thinks that work, a two-volume set published in 1924, is "still important today, due, at least, to the historical perspective it provides of a golden age when things were first being learned and done."

Stodola could be considered the first Control Engineer. He carried out fundamental work in turbine and compressor design and was instrumental in having a mathematician colleague formulate a stability criterion for turbine control. He introduced the use of time constants and dimensionless numbers to modeling that not only helped one manipulate equations, but also immediately interpret them in a physically meaningful way. Dimensionless numbers detached the system characteristics from the details of the physical construction of the machinery, a major step in the development of the systems approach.

From 1892 until his retirement in 1929, Stodola was Professor of Mechanical Engineering at the Polytechnikum in Zurich, which later became the Swiss Federal Institute of Technology. He was also a much sought after industrial consultant. His turbine engineering consulting group was an important factor in establishing Switzerland as a major manufacturer of steam and gas turbines.

Not content to rest upon his laurels after his retirement, Stodola wrestled with the engineer's place in society and the new physics. He maintained in his book, *Philosophy of an Engineer*, that engineers have a responsibility to take part fully in the public, intellectual, and cultural life of the community, to not be seduced by the magic of technology to the exclusion of everything else. He even gave a creditable account of relativity and quantum theory with some help from Einstein, who had been a colleague of his for a short time at the Institute. ■

References:

Bissell, C., *"Control engineer and much more: aspects of the work of Aurel Stodola,"* Measurement and Control, Vol. 22, May 1989, pp. 117-122.

Technical Training

Attendees of the Bently Rotor Dynamics Research Corporation Advanced Machinery Dynamics Course held in Singapore during October 1996. Donald Bently, Dr. Agnes Muszynska, Don Silcock and Rett Jesse presented topics at the course.